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42. Epipactis gigantea DOUGL.—Deer Park, Lower Arrow Lake and "Hot Springs," Kootenay Lake, B. C. Rare in Canada.

43. Allium Nevii WATS.—Lytton, B. C. Collected by Jas. McEvoy. Only found before in Canada on Vancouver Island.

44. Potamogeton crispus L.*—Ashbridge's Bay, east of Toronto, Ont. Collected by Wm. Scott.

45. Carex Tolmiei BOOTT, var. nigella BAILEY.*—Mts. at Kicking Horse Lake, Rocky Mts.

46. Carex marcida BOOTT, var. debilis BAILEY.*—Kicking Horse Lake, Rocky Mts.

47. Agrostis geminata, TRIN.*—Rogers' Pass, Selkirk Mts.

48. Agrostis alpina.*—Rogers' Pass, Selkirk Mts., B. C.

49. Alopecurus geniculatus L. var. robustus VASEY, (n. var.) Kicking Horse Lake, Rocky Mts.

50. Deyeuxia glomerata VASEY, (n. sp.)—Kicking Horse Lake, Rocky Mts.

51. Deyeuxia Canadensis HOOK. var. occidentalis VASEY.* Kicking Horse Lake, Rocky Mts.

Ottawa, Canada.

What the station botanists are doing.

BYRON D. HALSTED.

The present season is one of unusual activity among station botanists. At the risk of repetition I record briefly the leading points obtained by the several workers and in the alphabetical order of their names:

ALWOOD, of Virginia, has demonstrated an effective treatment for a leaf blight of the apple and established the fact that weak Bordeaux preparations are as effective for grape rot as stronger ones. He has been successful in the artificial pollination of wheat.

ARTHUR, of Indiana, has shown that the water for killing smut spores in soaking wheat can be heated to a considerably higher temperature than heretofore thought safe, and that this treatment, while effective in destroying the smut spores, much increases the yield of the grain. He has shown that the copper sulphate method is effective with oats but detrimental to

the yield, and that the hot water method is equally effective. Results in the method of preparing seed potatoes have been obtained that may materially modify the customary ways of planting.

ATKINSON, of Alabama, has considered the fungous diseases of the cotton, describing some new species and recommending methods of treatment. He finds *Colletotrichum gossypii* South. on leaves and stems of cotton as well as the bolls; notes great injury to the fig by *Uredo Fici*, with suggestions as to spraying the tree to prevent it, and records for the first time in the United States the *Cercospora Bolleana* on leaves of the fig. He describes the nature of "Frenching" in cotton and shows that it is due to a fungus—a species of *Fusarium*. Critical notes have been published upon Erysipheæ of the Carolinas and Alabama, including the new species, *Microsphæra caloclad-ophora* on *Quercus aquatica*.

BEAL, of Michigan, continues his experiments on grasses and clovers, that were planned several years ago.

BESSEY, of Nebraska, has investigated the natural forestry of the state and will soon publish the results. He is continuing his study of the forage problem of the plains.

BURRILL, of Illinois, has determined practical methods of exterminating Canada thistles. These pests do not seed in the rich prairie soil, but spread by rootstocks. Excellent results have been obtained with copper compounds as fungicides for grape rot, apple scab and potato blight. The latter is demonstrated to be a bacterial disease. A serious trouble of the blackberry and raspberry he has traced to the twig blight of pears (*Micrococcus amylovorus*). Studies are in progress upon several other bacterial diseases. *Puccinia rubigovera* has been found living over winter in the leaves of wheat and producing rust spores in early spring which grow upon the fresh foliage.

CHESTER, of Delaware, while confining himself almost exclusively to treatment of fungous diseases, has, in connection with the chemist, reached important conclusions as to the preparation of fungicides; e. g., in the use of carbonate of ammonia instead of aqua ammonia; the employment of glue and the use of a double hyposulphate of copper. It is now too early to report upon many field experiments. A study has been made of leaf spot of alfalfa, wheat scab, and rot of scarlet clover.

CRANDALL, of Colorado, is making a flora of the state, paying particular attention to the native grasses and fruits, and diseases of cultivated crops.

DETMERS, of Ohio, is studying the life history of the blackberry and raspberry, apple scab and potato blight, and the value of various fungicides. A state herbarium is being made.

DUDLEY, of New York, has found that the clover rust, prevalent from New England to the Sierras, is chiefly propagated in the uredo form, and is carried over the winter as mycelium. It was demonstrated that the æcidiospores produce uredo spots, and therefore the *Æcidium Trifolium-repentis* and *Uromyces Trifolii* are stages of the same species. The rust spores germinate best at a low temperature. As the second crop is most frequently infested, and as this is a valuable fertilizer, it often may be well to plow it under. The ordinary spores of the quince blight (*Entomosporium maculatum*) winter on the fallen leaves, not on the tree, so that germinating in early spring they infect the host directly. Therefore all leaves should be burned in autumn.

GARMAN, of Kentucky, shows that Bordeaux mixture and eau celeste will check the strawberry blight. Salt and lime may be used to prevent the growth of the broom rape, but will injure the host plant. Blue stone is satisfactory except its expensiveness. Hot water may be used to kill the broom rape seed, while doing no injury to, but rather benefiting, the hemp seed. Broom rape seed will retain its vitality in the soil for at least ten years. Anthracnose of the grape can be controlled by using blue stone $6\frac{1}{2}$ lbs., lime $3\frac{1}{2}$ lbs. to 22 gallons of water.

HALSTED, of New Jersey, is studying sweet potato and egg-plant diseases in particular, and looking after weeds in a general way.

HARVEY, of Maine, in his tests for germination of seeds, finds that a solution of corrosive sublimate of a proper strength to destroy the germs of mould, will injure the vitality of the treated seed. Fungicides and weeds are receiving attention.

HUMPHREY, of Massachusetts, has found the true pycnidial form of the black knot fungus, identified the "damping off" fungus with that causing the same trouble in Europe, added new facts concerning the scab of potatoes, the Peronosporeæ of the cucumber and the hibernation of cherry rot.

JONES (L. R.), of Vermont, during this his first year, is ex-

perimenting with fungicides upon potato rot, apple scab and rust, and oat and corn smut, but it is too soon for a report of results.

KELLERMAN, of Kansas, is moving to Ohio, but his work upon smuts and breeding of corn will remain as fine examples of his many important investigations beyond the Missouri.

LAMSON, of New Hampshire, writes that his work in the station for the year consists in collecting grasses, weeds and weed seeds, and of beginning in mycology and bacteriology.

MCCARTHY, of North Carolina, besides preparing a hundred page bulletin upon best agricultural grasses, has given much attention to field experiments with fungicides. The Burgundy mixture with soap is superior to the Bordeaux and the latter is improved by adding a small amount of glue. Seed testing is continued in co-operation with other stations.

MILL, of Alabama, has made a microscopic study of the cotton plant and is endeavoring to improve its fiber and seed by crossing. The effect upon lumber of tapping for rosin is being investigated. Wild grasses for grazing purposes and weeds are receiving attention.

SCRIBNER, of Tennessee, has a report ready for the press upon the grasses of the state. The work upon fungous diseases is being continued.

TRACY, of Mississippi, is engaged upon a flora of the state, is deeply interested in grasses and the blight of the tomato.

THAXTER, of Connecticut, it is with regret I note, has retired from distinctively station work, after doing excellent service in economic mycology. The results of his study of the onion smut, potato scab, apple rust and other fungous enemies, and means of controlling them, will be of permanent value. Dr. Sturgis succeeds him at New Haven.

BUCKHOUT, of Pennsylvania, and some others have a full load of college work.

BOLLEY, of North Dakota, and WOONTON, of New Mexico, are busy in their new fields.

New Brunswick, N. J.